Trend Study 25A-9-99

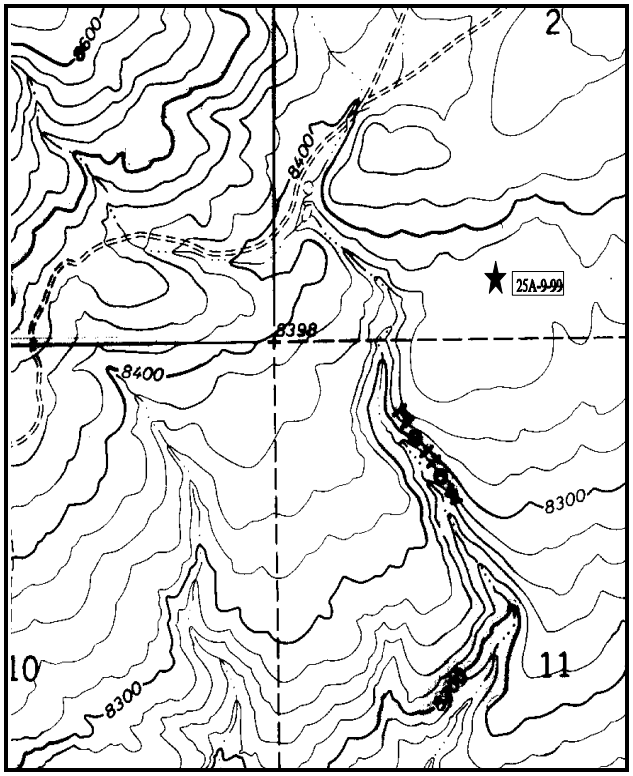
Study site name: Row of Pines . Range type: Big Sagebrush .

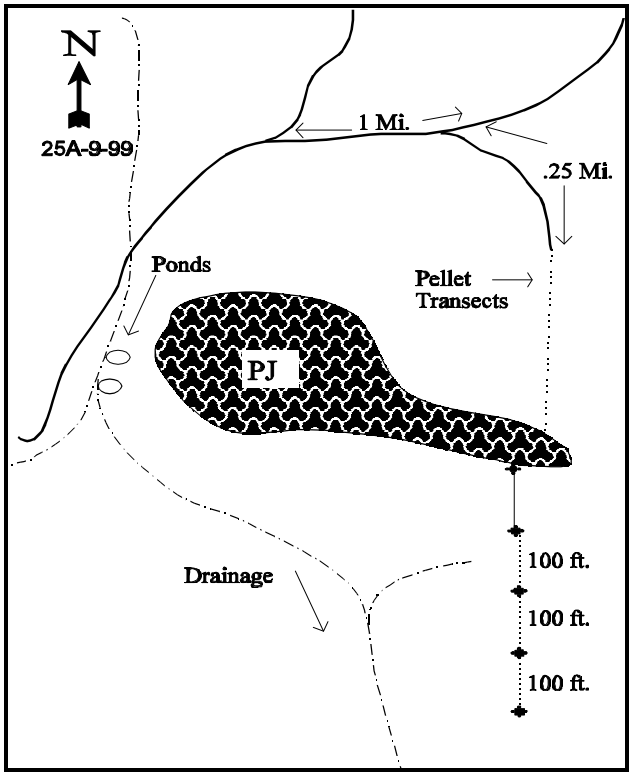
Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Loa, proceed northwest on U-24 for 3.8 miles (0.9 miles beyond mile marker 49). Turn right and go 0.7 miles to a cattleguard. Just beyond the cattleguard turn right and go another 0.7 miles. Turn right and go across a cattleguard. Proceed 2.7 miles to an intersection, turn right and continue 1.3 miles to a stock pond on the east side of the road. Continue 0.2 miles to a fork, turn right and go 0.05 miles. Turn right and go 0.25 miles to the end of the road, where a pellet group transect begins. On the left side of the road is a gray fence post which marks the north end of the pellet transect. Count 16 stakes south through the belt of pinyon-juniper (the 16th stake is 25 feet from the trees). The beginning of the frequency baseline is 50 feet west of the 16th pellet group stake. Rebar (2-1/2 feet tall) is used to mark the transect, the 0-foot baseline stake has a red browse tag #7064 attached.





Map Name: Loa, Utah

Diagrammatic Sketch

Township 27S , Range 2E , Section 2

UTM 4259722.469 N, 442185.117 E

DISCUSSION

Trend Study No. 25A-9 (44-3)

The Row of Pines trend study is located near the top of a gently sloping bench, north of Loa, near a row of pinyon pines. The bench has a general south aspect, but the site is nearly level. Elevation is 8,400 feet. The study samples a sagebrush-perennial grass type starting near a stand of pinyon and juniper trees. Besides the trees near the 0 foot stake, there are few trees and escape cover on the sagebrush flat. This area is within the seven mile allotment which allows cattle grazing on a deferred rotation system for approximately 20 days in May. Pellet group data from the site in 1999 estimate light use with 13 deer, 1 elk, and 3 cow days use/acre (32 ddu/ha, 3 edu/ha, 7 cdu/ha). Rabbit sign was also moderately abundant. Deer and rabbit pellets were more common near the 0 foot stake which is closer to the escape and thermal cover of the pinyon and juniper trees.

Soil at the site is moderately shallow with abundant gravel sized rocks on the surface and throughout the soil profile. Texture is a sandy clay loam with a neutral pH (6.9). Organic matter is low at only 1.1% and phosphorus is marginal at 9.1 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The majority of protective ground cover comes shrubs and pavement. Litter is low and has steadily declined since 1988, while rock and pavement cover have steadily increased. However, percent cover of bare ground was relatively low at 18% in 1988 and 1999. The protective ground cover and gentle slope appear to preclude serious erosion problems.

The dominant browse is Wyoming big sagebrush which provided 72% of the browse cover in 1999, with a cover value of 25%. These shrubs displayed moderate to heavy hedging in 1988 with lighter use reported in 1991 and 1999. Many of the sagebrush have displayed short leader growth and few seed stalks over the years, indicating poor vigor. Decadent plants are common with percent decadence ranging between 41% and 52% since 1988. In addition, many decadent plants have been classified as dying since 1988, although the population overall has remained relatively stable. Seedlings were common in 1988 yet lacking in 1991 and 1999. Young plants have been moderately abundant on each reading, but not in high enough numbers to replace decadent/dying individuals. Currently 44% of the 2,900 decadent plants are classified as dying (1,276 plants/acre) and there are only 380 young plants/acre available to replace them indicating an apparent decline in the population.

The black sagebrush had a similar age structure to mountain big sagebrush in 1988 and 1991. Utilization was moderate in 1988 and 1999 but mostly light in 1991. Vigor was considered poor on one-third of the population in 1991, although only 8% of the black sagebrush currently display poor vigor. Recruitment is currently poor with no seedlings and few young sampled in 1999. Broom snakeweed is the most numerous browse species, especially on the upper (south) end of the study site. It had a high density of 10,732 plants/acre in 1988, which dropped dramatically to only 1,465 plants/acre in 1991. This was a common occurrence throughout the management area. The much larger sample used in 1999 estimated a similar density compared to 1988 at 11,300 plants/acre. It currently (‘99) has a mostly mature population. Other increasers present in low numbers are narrowleaf low rabbitbrush and prickly pear cactus.

The herbaceous understory is dominated by blue grama, a low-growing warm season perennial that provides very little forage. It currently provides 84% of the grass cover and 73% of the herbaceous cover. The only other grass found more than occasionally is bottlebrush squirreltail. Forbs are small and sparse. They provided only about 1% total cover in 1999.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable and there is no serious erosion evident. The vegetative trend is presently down, as populations of big and black sagebrush appear to be declining.

1991 TREND ASSESSMENT

Soil trend is slightly downward because of lower vegetative cover and increase in bare ground and decrease in litter cover. These are all downward indicators reflective of an extended drought. The two key browse species are also showing a slightly downward trend with population losses of 5% and 2% respectively for black sagebrush and Wyoming big sagebrush. The occurrence of Wyoming big sagebrush on this site instead of mountain big sagebrush, further illustrates the relative dryness of the site. This is additionally compounded by the relatively high density the sagebrush populations contends with on this site. The herbaceous understory trend is stable but in poor condition because the dominant grass is a very low growing warm season grass (blue grama) which is of little value for spring or fall use.

TREND ASSESSMENT
soil - slightly downward, could quickly change with the return of normal precipitation patterns
browse - slightly downward
herbaceous understory - stable but poor

1999 TREND ASSESSMENT

Trend for soil is up. Percent cover of bare ground has declined from 28% to 18%. Litter cover has declined however, and percent cover of rock and pavement has increased slightly. Vegetation cover numbers increased dramatically, but vegetation cover data from 1988 and 1991 measured only basal cover, while aerial cover is estimated now so the numbers are not comparable. There appears to be little erosion due to the levelness of the terrain. Trend for the key species, Wyoming big sagebrush is down slightly. Density has declined since 1991, but some of the change is due to the much larger sample used in 1999. Use is heavier, and percent decadence remains high. In addition, a large portion of the decadent plants sampled (44%) appear to be dying. Recruitment is currently inadequate to replace the dying plants. The less abundant black sagebrush appears to be more stable but only contributes to 13% of the browse cover. Trend for the herbaceous understory is up for grasses and stable for forbs. Overall trend is considered up since grasses provide nearly all of the herbaceous cover. Composition is poor however, with the low growing warm season, blue grama, providing 84% of the grass cover.

TREND ASSESSMENT
soil - up
browse - slightly downward
herbaceous understory - up but composition is poor

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 9

Type	Species	Nested Frequency '85	'91	'99	Quadrat Frequency '85	'91	'99	Average Cover % '99
G	Agropyron smithii	a-	a-	b12	-	-	4	.07
G	Agropyron spicatum	-	-	6	-	-	2	.01
G	Bouteloua gracilis	100	102	173	43	43	63	5.55
G	Oryzopsis hymenoides	b31	a7	a10	16	3	6	.10
G	Poa secunda	-	-	2	-	-	1	.00
G	Sitanion hystrix	a58	ab82	b110	30	41	47	.84
G	Stipa pinetorum	a-	b4	ab4	-	3	2	.03
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		189	195	317	89	90	125	6.63
Total for Grasses		189	195	317	89	90	125	6.63
F	Androsace septentrionalis (a)	-	-	87	-	-	40	.44
F	Arabis demissa	b22	ab12	a6	13	7	3	.04
F	Astragalus lentiginosus	b21	a3	a3	12	2	2	.01
F	Cryptantha spp.	ab2	b7	a-	1	3	-	-
F	Descurainia pinnata (a)	-	-	4	-	-	2	.01
F	Eriogonum ovalifolium	7	16	13	5	8	8	.19
F	Erigeron pumilus	b20	a-	b34	9	-	17	.23
F	Phlox longifolia	a8	b33	a-	5	15	-	.00
F	Senecio multilobatus	a-	a1	b23	-	1	13	.06
Total for Annual Forbs		0	0	91	0	0	42	0.45
Total for Perennial Forbs		80	72	79	45	36	43	0.54
Total for Forbs		80	72	170	45	36	85	0.99

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 25A, Study no: 9

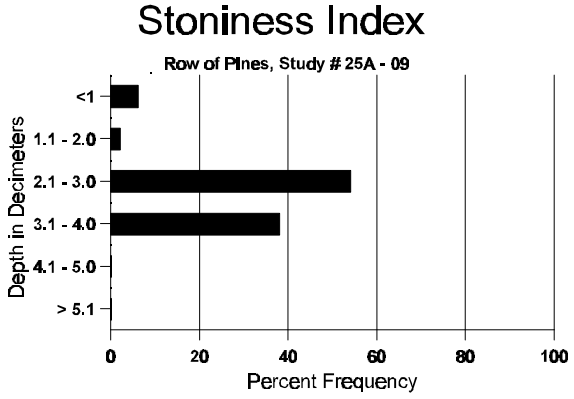
Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia frigida	6	.03
B	Artemisia nova	20	4.51
B	Artemisia tridentata wyomingensis	93	24.40
B	Chrysothamnus viscidiflorus	0	-
B	Gutierrezia sarothrae	64	4.71
B	Opuntia fragilis	11	.06
B	Pediocactus simpsonii	1	-
B	Pinus edulis	0	-
Total for Browse		195	33.74

BASIC COVER --
Herd unit 25A, Study no: 9

Cover Type	Nested Frequency '99	Average Cover % '85	'91	'99
Vegetation	346	10.00	6.00	41.90
Rock	285	2.75	3.75	8.67
Pavement	405	31.75	34.75	33.29
Litter	413	34.50	24.50	22.44
Cryptogams	103	3.50	3.50	2.30
Bare Ground	362	17.50	27.50	18.19

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 09, Study Name: Row of Pines

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.7	51.6 (13.6)	6.9	51.3	23.4	25.3	1.1	9.1	192.0	0.5



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 9

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	28	n/a
Deer	15	13(32)
Elk	0	1(2)
Cattle	3	3(7)

BROWSE CHARACTERISTICS --
Herd unit 25A, Study no: 9

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	2	5	1	-	-	-	-	-	10	-	-	-	200	3	4	10
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'99	17%	42%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	0%
	'91	0		0%
	'99	240		8%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	99	2	2	-	-	-	-	-	-	-	4	-	-	-	80			4
M	85	3	13	-	-	-	-	-	-	-	16	-	-	-	1066	10	13	16
	91	13	-	-	-	1	-	-	-	-	14	-	-	-	933	8	14	14
	99	12	43	4	2	-	-	-	-	-	61	-	-	-	1220	10	17	61
D	85	9	8	-	-	-	-	-	-	-	17	-	-	-	1133			17
	91	18	1	-	1	-	-	-	-	-	7	1	-	12	1333			20
	99	5	10	-	-	-	-	-	-	-	9	-	-	6	300			15

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	53%	00%	00%	- 5%
'91	05%	00%	32%	-37%
'99	69%	05%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	2665	Dec:		43%
'91	2532			53%
'99	1600			19%

Artemisia tridentata wyomingensis																		
S	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	3	-	-	2	-	-	6	-	-	-	120			6
Y	85	3	2	2	-	-	-	-	-	-	7	-	-	-	466			7
	91	12	-	-	-	-	-	-	1	-	13	-	-	-	866			13
	99	17	-	-	-	-	-	2	-	-	19	-	-	-	380			19
M	85	6	44	10	-	-	-	-	-	-	60	-	-	-	4000	16	17	60
	91	20	8	-	19	-	-	-	-	-	47	-	-	-	3133	16	19	47
	99	48	109	30	4	-	-	-	-	-	191	-	-	-	3820	18	28	191
D	85	6	30	23	-	-	-	-	-	-	43	-	-	16	3933			59
	91	38	14	6	5	1	-	-	-	-	51	-	1	12	4266			64
	99	77	34	14	7	9	-	4	-	-	81	-	-	64	2900			145
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	800			40

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	60%	28%	13%	- 2%
'91	19%	05%	10%	-14%
'99	43%	12%	18%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	8399	Dec:		47%
'91	8265			52%
'99	7100			41%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus																		
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	7	9	3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	466	Dec:		57%
'91	0			0%
'99	0			0%

Gutierrezia sarothrae																		
S	85	20	-	-	-	-	-	-	-	-	20	-	-	-	1333			20
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	43	-	-	-	-	-	-	-	-	43	-	-	-	860			43
Y	85	52	-	-	-	-	-	-	-	-	52	-	-	-	3466			52
	91	9	1	-	-	-	-	-	-	-	10	-	-	-	666			10
	99	44	-	-	-	-	-	-	-	-	44	-	-	-	880			44
M	85	102	2	-	-	-	-	-	-	-	104	-	-	-	6933	8	7	104
	91	1	-	-	1	2	-	-	-	-	4	-	-	-	266	2	2	4
	99	504	-	-	6	-	-	-	-	-	510	-	-	-	10200	8	9	510
D	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	3	2	2	-	-	-	1	-	-	6	1	-	1	533			8
	99	11	-	-	-	-	-	-	-	-	6	-	-	5	220			11
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	01%	00%	00%	-86%
'91	23%	09%	05%	+87%
'99	00%	00%	.88%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	10732	Dec:	3%
'91	1465		36%
'99	11300		2%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia fragilis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	99	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220	3	9	11
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	+75%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'99	260		-

Pediocactus simpsonii																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	2	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'99	20		-

Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'99	0		-